

AMENDMENTS TO THE CLAIMS

- 1    1. (Original) A method for determining a logical path in a managed network between a  
2       source device and a destination device at a data link layer, the method comprising the  
3       computer-implemented steps of:  
4           creating and storing a Connected Group Space representation of network devices  
5               based on a topology space representation of the network devices;  
6           identifying an optimized path in the Connected Group Space representation;  
7           transforming the optimized path into the topology space representation; and  
8           creating and storing the optimized path that was transformed into the topology space  
9               representation as the data link layer path.
  
- 1    2. (Original) The method as recited in Claim 1, wherein the managed network is a  
2       managed IP network.
  
- 1    3. (Original) The method as recited in Claim 1, wherein the step of creating and storing  
2       a Connected Group Space representation further comprises the steps of:  
3           identifying a set of Connected Group nodes associated with the Connected Group  
4               Space representation;  
5           identifying Connected Group links that connect the Connected Group nodes; and  
6           creating and storing information that represents the Connected Group links.
  
- 1    4. (Original) The method as recited in Claim 1, wherein the step of creating and storing  
2       a Connected Group Space representation further comprises the steps of:  
3           identifying a subnet associated with the source device and the destination device;

4       determining a set of network links that link one or more network devices in the  
5                         managed network; and  
6       determining an assignment of ports of network devices.

1       5. (Original) The method as recited in Claim 1, wherein the step of creating and storing  
2                         a Connected Group Space representation further comprises the steps of:  
3                         identifying all Virtual Local Area Networks (VLANs) associated with a subnet  
4                         associated with the source device and the destination device; and  
5                         identifying all Emulated Local Area Networks (ELANs) associated with the subnet.

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1       6. (Original) The method as recited in Claim 1, wherein the step of creating and storing  
2                         a Connected Group Space representation further comprises the steps of:  
3                         creating one Connected Group node for any pairs of interfaces across a point-to-point  
4                         link in the topology space representation;  
5                         creating one Connected Group node for any interfaces of the managed network that  
6                         are directly connected by virtue of being on a same physical medium;  
7                         creating one Connected Group node for LAN Emulation interfaces on a same  
8                         Emulated Local Area Network (ELAN);  
9                         creating one Connected Group node for each internal interface of any network device  
10                         when the network device has an internal interface;  
11                         creating one Connected Group node for the source device;  
12                         creating one Connected Group node for the destination device; and  
13                         creating one Connected Group node for each user interface on any network device  
14                         when the network device has a user interface.

1    7. (Original) The method as recited in Claim 6, further comprising the step of  
2       determining Connected Group links between Connected Group nodes in a subnet  
3       associated with the source device and the destination device.

1    8. (Original) The method as recited in Claim 7, further comprising the step of creating  
2       one Connected Group link for each pair of interfaces within each network device,  
3       wherein each interface is associated with the subnet of the source device and the  
4       destination device and is in a forwarding state.

1    9. (Original) The method as recited in Claim 8, further comprising the step of checking  
2       a spanning tree status for each interface within each network device to determine  
3       whether the interface is in the forwarding state.  
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1    10. (Original) The method as recited in Claim 1, wherein the step of identifying an  
2       optimized path in the Connected Group Space representation further comprises the  
3       step of finding a shortest path between a Connected Group source node and a  
4       Connected Group destination node.

1    11. (Original) The method as recited in Claim 10, further comprising the step of using a  
2       Dijkstra algorithm to find the shortest path between the Connected Group source node  
3       and the Connected Group destination node.

1    12. (Original) The method as recited in Claim 1, wherein the step of transforming the  
2       optimized path into the topology space representation further comprises the steps of:

3       identifying an ordered set of Connected Group nodes associated with the optimized  
4                  path; and  
5        identifying an ordered set of Connected Group links associated with the ordered set of  
6                  Connected Group nodes.

1   13. (Original) The method as recited in Claim 12, further comprising the steps of:  
2                  identifying a pair of interfaces associated with each Connected Group link in the  
3                  ordered set of Connected Group nodes associated with the optimized path; and  
4                  generating an ordered set of topology space links from the pairs of interfaces  
5                  associated with Connected Group links.

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1   14. (Original) A computer-readable medium carrying one or more sequences of  
2                  instructions for determining a logical path in a managed network between a source  
3                  device and a destination device at a data link layer, wherein execution of the one or  
4                  more sequences of instructions by one or more processors causes the one or more  
5                  processors to perform the steps of:  
6                  creating and storing a Connected Group Space representation of network devices  
7                  based on a topology space representation of the network devices;  
8                  identifying an optimized path in the Connected Group Space representation;  
9                  transforming the optimized path into the topology space representation; and  
10                 creating and storing the optimized path that was transformed into the topology space  
11                 representation as the data link layer path.

1    15. (Original) The computer-readable medium as recited in Claim 14, wherein the  
2       managed network is a managed IP network.

1    16. (Original) The computer-readable medium as recited in Claim 14, wherein the step of  
2       creating and storing a Connected Group Space representation further comprises the  
3       steps of:  
4           identifying a set of Connected Group nodes associated with the Connected Group  
5           Space representation;  
6           identifying Connected Group links that connect the Connected Group nodes; and  
7           creating and storing information that represents the Connected Group links.

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1    17. (Original) The computer-readable medium as recited in Claim 14, wherein the step of  
2       creating and storing a Connected Group Space representation further comprises the  
3       steps of:  
4           identifying a subnet associated with the source device and the destination device;  
5           determining a set of network links that link one or more network devices in the  
6           managed network; and  
7           determining an assignment of ports of network devices.

1    18. (Original) The computer-readable medium as recited in Claim 14, wherein the step of  
2       creating and storing a Connected Group Space representation further comprises the  
3       steps of:  
4           identifying all Virtual Local Area Networks (VLANs) associated with a subnet  
5           associated with the source device and the destination device; and

6 identifying all Emulated Local Area Networks (ELANs) associated with the subnet  
7 associated with the source device and the destination device.

1 19. (Original) The computer-readable medium as recited in Claim 14, wherein the step of  
2 creating and storing a Connected Group Space representation further comprises the  
3 steps of:

4 creating one Connected Group node for any pairs of interfaces across a point-to-point  
5 link in the topology space representation;

6 creating one Connected Group node for any interfaces of the managed network that  
7 are directly connected by virtue of being on a same physical medium;

8 creating one Connected Group node for LAN Emulation interfaces on a same  
9 Emulated Local Area Network (ELAN);

10 creating one Connected Group node for each internal interface of any network device  
11 when the network device has an internal interface;

12 creating one Connected Group node for the source device;

13 creating one Connected Group node for the destination device; and

14 creating one Connected Group node for each user interface on any network device  
15 when the network device has a user interface.

1 20. (Original) The computer-readable medium as recited in Claim 19, further comprising  
2 the step of determining Connected Group links between Connected Group nodes in a  
3 subnet associated with the source device and the destination device.

1    21. (Original) The computer-readable medium as recited in Claim 20, further comprising  
2       the step of creating one Connected Group link for each pair of interfaces within each  
3       network device, wherein each interface is associated with the subnet of the source  
4       device and the destination device, and is in a forwarding state.

1    22. (Original) The computer-readable medium as recited in Claim 21, further comprising  
2       the step of checking a spanning tree status for each interface within each network  
3       device to determine whether the interface is in the forwarding state.

1    23. (Original) The computer-readable medium as recited in Claim 14, wherein the step of  
2       identifying an optimized path in the Connected Group Space representation further  
3       comprises the step of finding a shortest path between a Connected Group source node  
4       and a Connected Group destination node.

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1    24. (Original) The computer-readable medium as recited in Claim 23, further comprising  
2       the step of using a Dijkstra algorithm to find the shortest path between the Connected  
3       Group source node and the Connected Group destination node.

1    25. (Original) The computer-readable medium as recited in Claim 14, wherein the step of  
2       transforming the optimized path into the topology space representation further  
3       comprises the steps of:  
4       identifying an ordered set of Connected Group nodes associated with the optimized  
5       path; and

6 identifying an ordered set of Connected Group links associated with the ordered set of  
7 Connected Group nodes.

1 26. (Original) The computer-readable medium as recited in Claim 25, further comprising  
2 the steps of:

3 identifying a pair of interfaces associated with each Connected Group link in the  
4 ordered set of Connected Group nodes associated with the optimized path; and  
5 generating an ordered set of topology space links from the pairs of interfaces  
6 associated with Connected Group links.

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1 27. (Original) A computer data signal embodied in a carrier wave, the computer data  
2 signal carrying one or more sequences of instructions for determining a logical path  
3 in a managed network between a source device and a destination device at a data link  
4 layer, wherein execution of the one or more sequences of instructions by one or more  
5 processors causes the one or more processors to perform the steps of:  
6 creating and storing a Connected Group Space representation of network devices  
7 based on a topology space representation of the network devices;  
8 identifying an optimized path in the Connected Group Space representation;  
9 transforming the optimized path into the topology space representation; and  
10 creating and storing the optimized path that was transformed into the topology space  
11 representation as the data link layer path.

1    28. (Original) A computer apparatus comprising:  
2                a processor; and  
3                a memory coupled to the processor, the memory containing one or more sequences  
4                of instructions for determining a logical path in a managed network between  
5                a source device and a destination device at a data link layer, wherein  
6                execution of the one or more sequences of instructions by the processor  
7                causes the processor to perform the steps of:  
8                creating and storing a Connected Group Space representation of network  
9                devices based on a topology space representation of the network  
10               devices;  
11               identifying an optimized path in the Connected Group Space representation;  
12               transforming the optimized path into the topology space representation; and  
13               creating and storing the optimized path that was transformed into the  
14               topology space representation as the data link layer path.

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1    29. (New) The method of claim 1, further comprising the step of monitoring network  
2                devices by obtaining information about the network devices from information  
3                associated with the data linked path.

1    30. (New) The method of claim 1, further comprising the step of obtaining diagnostic  
2                information by obtaining information about the network devices from information  
3                associated with the data linked path.

1    31. (New) The method of claim 1, wherein the data link path is a trace of a path  
2                    determinable from a bridge forwarding table.

1    32. (New) The method of claim 1, wherein the data link path is verifiable by comparing  
2                    information related to the data link path to information from a bridge forwarding  
3                    table.

1    33. (New) The computer readable medium of claim 14, wherein the instructions further  
2                    comprise the step of monitoring network devices by obtaining information about the  
3                    network devices from information associated with the data linked path.

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1    34. (New) The computer readable medium of claim 14, wherein the instructions further  
2                    comprise the step of obtaining diagnostic information by obtaining information  
3                    about the network devices from information associated with the data linked path.

1    35. (New) The computer readable medium of claim 14, wherein the data link path is a  
2                    trace of a path determinable from a bridge forwarding table.

1    36. (New) The computer readable medium of claim 14, wherein the data link path is  
2                    verifiable by comparing information related to the data link path to information from  
3                    a bridge forwarding table.